

Claims:

1. A process for coating bodies comprising:
producing an upward spray of coating fluid by means of a two-fluid nozzle to create a coating zone, and
contacting said bodies with said spray of coating fluid in said coating zone;
wherein,
before contacting said bodies with said spray, providing the bodies with a spinning movement by a central impact of gas jets directed upward to intersect the centerline of said spray;
guiding the spinning bodies by said gas jets towards a central position over the two-fluid nozzle, thereby increasing the number of suspended bodies contacting the spray;
providing atomization gas to the two-fluid nozzle in an amount less than the one which, after moderation by means of muffling gas, would scatter the bodies in the spray zone; and
pneumatically muffling the atomization gas just above the nozzle to reduce the body scattering effect thereof; and further wherein,
said bodies are pneumatically transported in said coating zone in a non-fluidized state
2. A process according to claim 1, wherein the muffling of the atomizing gas is accomplished by blowing in muffling gas encircling the nozzle and partially tangential in relation thereto to produce a swirling upward flow encircling the nozzle and influencing the atomizing gas leaving the nozzle, thereby decreasing the upward body lifting and scattering effect thereof.

3. A process according to claim 2, wherein said muffling gas is provided through grooves connected to a source of gas also feeding said gas jets impacting acentrally on the bodies.

4. A process according to claim 2, wherein the muffling gas is provided through a mantel surrounding the two-fluid nozzle thereby forming a three-fluid nozzle

5. A process according to claim 1, wherein each of the bodies being coated has a maximum dimension of from 2 to 50 mm.

6. A process according to claim 1, wherein each of the bodies being coated has a maximum dimension of from 3 to 30 mm.

7. A process according to claim 1, wherein the number of bodies being coated simultaneously is less than 1000 per nozzle.

8. A process according to claim 1, wherein the gas jets have a velocity of 80-180 m/sec.

9. A process according to claim 1, wherein the gas jets have a velocity of 100-150 m/sec.

10. An article of manufacture comprising an apparatus and a label which indicates that said apparatus can be used for coating tablets wherein said apparatus comprises:

a housing including at least one coating station which comprises:

a perforated base plate having an inclined upper surface;

an upward directed two-fluid nozzle located centrally in the base plate, said inclined upper surface being inclined toward the nozzle;

means for providing coating liquid to said nozzle to provide a spray from said nozzle;

means for providing gas to the nozzle to provide a flow of atomizing gas from said nozzle;

means for providing an upward gas stream through the perforations in the base plate;

and

muffling means for pneumatically muffling the atomizing gas shortly after the atomizing gas has left the nozzle to decrease upward scattering effect of said gas on the tablets being coated,

wherein the perforations of the base plate are ducts arranged around the nozzle such that their respective longitudinal axes intersect at a center line of said nozzle and

wherein an area above the base plate influenced by the spray and the atomizing gas flow from said nozzle, and by gas flow from the muffling means and from the ducts, is without partition.

11. An article of manufacture according to claim 10, wherein the means for pneumatically muffling the atomizing gas comprises outlets of gas supply means encircling the two-fluid nozzle and providing a rotating upward gas flow which meets the upward spreading atomizing gas stream from the two-fluid nozzle to decrease the upward velocity thereof and to deflect said upward gas flow into a broader swirling flow.

12. An article of manufacture according to claim 11, wherein said gas supply means are grooves in the base plate connected to a plenum which also supplies gas to said ducts in the base plate.

13. An article of manufacture according to claim 11, wherein said gas supply outlets debouch in an annular upward open cavity encircling the nozzle.

14. An article of manufacture according to claim 10, wherein the means for pneumatically muffling of the atomizing gas comprises a mantel surrounding the two-fluid nozzle thereby forming a three-fluid nozzle.

15. An article of manufacture according to claim 10, wherein the inclination of the base plate to the horizontal level is $5-20^{\circ}$, preferably $10-15^{\circ}$, and the ducts concentric around the nozzle are essentially perpendicular to the inclining upper surface of the base plate.

16. An article of manufacture according to claim 10, wherein the distances between the ducts are selected depending on the size of tablets to be coated to be from 0.2 to 1.5 times the largest dimension of the tablets.

17. An article of manufacture according to claim 10, wherein a vertical or a slightly upward broadening conical wall extends from the periphery of the inclined area of the upper surfaces of the base plate, which wall at distance from the base plate changes direction to form a more expanding conus.

18. An article of manufacture according to claim 10, wherein said housing includes a plurality of said coating stations mutually separated by partial separating walls placed on or close to the base plates, the height of which walls is less than the maximum height to which the tablets are lifted during the operation of the apparatus, thereby enabling controlled transfer of tablets from one station to another.

19. A plurality of bodies having been subjected to a coating process whereby each of said bodies is coated with at least one coating containing a low dose of an active pharmaceutical ingredient (API) wherein the relative standard deviation (RSD) between the said at least one coatings on said bodies is equal to or less than about 5%.

20. The plurality of bodies of claim 19 wherein said dose of API is equal to or less than about 400 micrograms.

21. The plurality of bodies of claim 19 wherein said dose of API is equal to or less than about 200 micrograms.

22. The plurality of bodies of claim 19 wherein said RSD is less equal to or less than about 3%.

23. The plurality of bodies of claim 19 wherein said RSD is less equal to or less than about 2%.

24. The plurality of bodies of claim 19 wherein said RSD is substantially equivalent to the RSD of the uncoated bodies.

25. An apparatus for coating bodies having mean sizes in the range of from approximately 2 mm to approximately 50 mm comprising:

- a housing including at least one coating station which comprises:
- a perforated base plate having an inclined upper surface;
- an upward directed two-fluid nozzle located centrally in the base plate, said inclined upper surface being inclined toward the nozzle;
- means for providing coating liquid to said nozzle to provide a spray from said nozzle;
- means for providing gas to the nozzle to provide a flow of atomizing gas from said nozzle;
- means for providing an upward gas stream through the perforations in the base plate;
- and
- muffling means for pneumatically muffling the atomizing gas shortly after the atomizing gas has left the nozzle to decrease upward scattering effect of said gas on the bodies being coated,
- wherein the perforations of the base plate are ducts arranged around the nozzle such that their respective longitudinal axes intersect at a center line of said nozzle and
- wherein an area above the base plate influenced by the spray and the atomizing gas flow from said nozzle, and by gas flow from the muffling means and from the ducts, is without partition.

26. An apparatus according to claim 25, wherein the means for pneumatically muffling the atomizing gas comprises outlets of gas supply means encircling the two-fluid nozzle and providing a rotating upward gas flow which meets the upward spreading

atomizing gas stream from the two-fluid nozzle to decrease the upward velocity thereof and to deflect said upward gas flow into a broader swirling flow.

27. An apparatus according to claim 26, wherein said gas supply means are grooves in the base plate connected to a plenum which also supplies gas to said ducts in the base plate.

28. An apparatus according to claim 25, wherein said gas supply outlets debouch in an annular upward open cavity encircling the nozzle.

29. An apparatus according to claim 25, wherein the means for pneumatically muffling of the atomizing gas comprises a mantel surrounding the two-fluid nozzle thereby forming a three-fluid nozzle.

30. An apparatus according to claim 25, wherein the inclination of the base plate to the horizontal level is 5-20.degree, preferably 10-15.degree, and the ducts concentric around the nozzle are essentially perpendicular to the inclining upper surface of the base plate.

31. An apparatus according to claim 30, wherein the distances between the ducts are selected depending on the size of bodies to be coated to be from 0.2 to 1.5 times the largest dimension of the tablets.

32. An apparatus according to claim 25, wherein a vertical or a slightly upward broadening conical wall extends from the periphery of the inclined area of the upper surfaces

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of the base plate, which wall at distance from the base plate changes direction to form a more expanding conus.

33. An apparatus according to claim 25, wherein said housing includes a plurality of said coating stations mutually separated by partial separating walls placed on or close to the base plates, the height of which walls is less than the maximum height to which the bodies are lifted during the operation of the apparatus, thereby enabling controlled transfer of bodies from one station to another.